WISIONS
of sustainability

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PREP

Promotion of Resource Efficiency Projects

Microfinance and renewable Energy
Investing in a sustainable future

I. Issue 2006

www.wisions.net

WISIONS

Sustainable Development is possible

WISIONS is an initiative of the Wuppertal Institute for Climate, Environment and Energy, carried out with the support of the Swiss-based foundation Pro-Evolution, to foster practical and sustainable energy projects.

Sustainable development is possible. Numerous innovative and valuable contributions from different countries, fields and institutions have shown that an appropriate reconciliation of economic, ecological and social factors is not unrealistic utopia. We have made a promising start, but the greatest challenge still facing us in the 21st century is to learn how to use the world's resources more efficiently and in an ecologically sound and socially balanced way.

Progress is being made; however, a dozen years after the UN Conference on Environment and Development in Rio de Janeiro, many people, especially in developing countries, still lack access to resources, clean technologies, and education. At the same time, people's level of resource consumption and means of production remains unsustainable.

To meet global challenges like climate change, water scarcity and poverty, it is necessary to foster projects of potential strategic global importance by supporting them so that they can be implemented locally. Examples of good practice need to be actively promoted to a wider audience.

WISIONS promotes good practice in resource efficiency through its publication of relevant successful projects in its Promotion of Resource Efficiency Projects: PREP

WISIONS also provides consulting and support to ensure the potential seen in visions of renewable energy and energy efficiency can become mature projects through its Sustainable Energy Project Support: SEPS

Photo: PhotoDisc

SUSTAINABLE ENERGY PROJECT SUPPORT – SEPS

Realistic concepts and visions of effective sustainable energy projects exist, but the necessary implementation sometimes fails. The key objective of SEPS is to identify projects with the real potential to be of strategic importance in the renewable and efficient use of energy. By providing technical and other forms of support, SEPS seeks to overcome existing barriers and will help clean and efficient energy become commonplace. The most promising renewable energy and energy efficiency concepts are selected using transparent analysis based on internationally recognised criteria. Once a project is selected, SEPS can provide additional guidance and support, for example:

- practical expert advice and knowledge transfer for effective implementation
- potential financial support to assist with project implementation
- guidance and support for obtaining additional funding
- promotion to relevant institutions, decision makers and scientists
- publication on www.wisions.net

Microfinance and renewable Energy

Investing in a sustainable future

Studies carried out by the United Nations (UN) show that of the 4 billion people who live on less than 1,400 USD a year, only a fraction have access to basic financial services. Microfinance is one promising way to bridge this gap. It is not development aid but self-help assistance and microfinance institutions benefit from providing micro credits. Supporting the importance of access to microfinance, the UN designated the current year, 2005, as the 'International Year of Micro Credit'.

Originally, microfinance focused on the provision of very small loans to very poor families to help them undertake productive activities or grow their small business. Nowadays, with the realisation that the poor and the very poor, lacking access to traditional formal financial institutions, require a variety of financial products, microfinance has come to include a broader range of services (credits, savings, insurance, etc.).

This WISIONS topic will focus on the microfinance of renewable energy systems. Some people equate energy only with lighting, television and other "quality of life" benefits. However, while improved energy services do have many quality of life benefits, the productive use of electricity can also help reduce poverty – leading to increased profitability and productivity for micro, small and medium enterprises, and cottage industries.

The remoteness of rural locations usually makes an expansion of the electricity supply in those areas through a centralised grid system difficult; therefore people not connected to the grid often rely on expensive fossil fuels such as diesel and kerosene. In remote areas, people often do not have the financial means to afford renewable energy.

Photo: PhotoDisc

In this brochure, WISIONS focuses on the micro financing of renewable energy systems. WISIONS presents projects from Peru, South Africa, China and Nepal that have been successfully implemented, with the intention of further promoting the particular approaches used by these projects. Using a key number of internationally accepted criteria, the main consideration for the selection of the microfinance projects was the inclusion of renewable energy technologies like solar/photovoltaic systems, wind energy and hydropower biogas used for cooking, lighting, power telecommunications equipment, radio, television, household electrification, health clinics, water pumping, milling and grinding, water disinfection, fencing, computer education, machinery operation, etc. in households or businesses.

All projects that fulfilled WISIONS application criteria were independently reviewed, and four of these, with the potential to make a significant impact on global energy and resource efficiency, are published in the following pages. WISIONS is pleased to present good practice examples from ambitious projects which have been successfully implemented on different continents. All of these projects are appropriate within their local context and have been developed to a level which meets WISIONS selection criteria. Although uniquely designed for a particular setting and problem, the projects presented can be adapted to different situations or can provide valuable information from their implementation phase. Links to the illustrated good practice examples shown in the brochure, as well as a couple of other issue-related projects, are available on www.wisions.net

The selected projects are not intended to represent the only possible directions to take in the field of microfinance and renewable energy but they do demonstrate promising approaches.

Photo: PhotoDisc

The next PREP-brochure, following the same objectives, namely to collect, evaluate and promote good practice examples, will highlight the issue of "Energy in Schools".

Revolving Fund for the Implementation of Small Hydro Schemes

Location:
Peru

Project's Aim:
Improve living standards

Technical Answer:
Revolving fund for the implementation of small hydro schemes

Photo: Soluciones Practicas

The objective of the project is to improve the living standards of the rural population in Peru by implementing Small Hydro Schemes (SHS), forming sustainable electricity services and promoting the productive use of energy. Its purpose is to promote a financial model that combines subsidised credits with technical assistance and an appropriate management model. The project is aimed at meeting small energy requirements in isolated rural areas that are impossible to serve with conventional electricity grids.

The project is based on two agreements with the Inter-American Development Bank. Under the first agreement for the period between 1992 and 1998, ITDG (Intermediate Technology Development Group), now called Practical Action, received a reimbursable contribution of USD 400,000 to establish the "Revolving Fund". A second agreement was signed in 2000, increasing the revolving fund by USD 200,000 and recommending the establishment of new management models and the promotion of productive and business activities capable of generating employment and income.

The financial model with the "Revolving Fund" combines a soft loan that includes technical assistance with joint financing by different institutions. The beneficiaries are farmers, small rural businessmen, communities, a producers' association, etc. A loan of up to USD 50,000 can be obtained for the construction of a SHS at a 10 per cent interest rate, repayable over a period of up to five years.

The management model is based on the efficient management of the service and active participation of the local population. The model consists of the owner of the SHS (the community and/or the municipality) handing it over to a private local enterprise under a detailed medium or long-term contract with clear and specific terms of reference that respect the current legal framework. The model therefore requires three main agents: the owner, the users and the local enterprise.

BENEFITS

In general, the implementation of SHS has both replaced and prevented the installation of diesel systems, which is a more affordable technology for rural populations. The CO_2 emissions from burning fossil fuels has, therefore, been reduced. In addition, the use of electricity has replaced the traditional use of candles and kerosene burners that not only contaminated people's homes but were also health hazards. 21 towns now receive electricity from SHS.

The electricity service management was created and reinforced and the technology for manufacturing SHS equipment was developed and transferred to small local manufacturers; local technical skills were also improved.

More than 200 new small businesses were created, which increased the population's income by one third. There is a positive impact on the social capital, defined as the capacity to act in an organised and co-operative manner, particularly in cases where the management model has been put into practice.

SUSTAINABILITY

Out of 28 SHS, 23 are operating and the rest have temporarily stopped for maintenance purposes or to complete their construction. No technical problems have been reported; the oldest scheme has been operating for over 10 years.

Organisation and training are important aspects of the management model. In fact, they are just as important as the implementation of the system, if not more so, as the future of the system largely depends on good organisation and training. Four successful schemes, the oldest of which has been operating since 1998, cover their operating and maintenance costs and keep a reserve fund for equipment replacement purposes.

TECHNOLOGY

Many schemes use existing irrigation facilities, no reservoirs or large water tanks are required and the turbine-driven water flows back into the river downstream.

The following technological packages are ready to be transferred: Pelton and axial turbines, as well as the use of induction generators.

FINANCIAL ISSUES

A value of approximately 2,621 USD/kW was established, including pre-investment costs and working capital. The investment per family is estimated at USD 1, 352. A study of a sample of projects implemented by the government reveals an investment of more than 5,000 USD/kW.

The average pre-investment cost per SHS is estimated at USD 14,885, which is a significant percentage of the total cost of the SHS.

Currently, the revolving fund consists of about USD 600,000; 31 loans worth USD 880,000 have been granted for 28 SHS and 50 single-family photovoltaic schemes, and more than 2,000 rural families have benefited from the project.

OBSTACLES

The main barriers encountered by the project were the limited payment capacity, loan guarantee restrictions, changing political aspects and the lack of an adequate legal framework.

In order to overcome these barriers, co-ordinated work was carried out with local and regional governments, government social aid programmes, co-operation institutions and the population in general, with a view to joining efforts to raise co-financing funds.

Furthermore, rural dwellers have no legal title deeds to their properties (the main source of loan guarantee); therefore efforts were made to formally register their properties so that they could become credit subjects with access to the credit of the Revolving Fund or to any other commercial credits.

Photo: Soluciones Practicas

REPLICABILITY

It would be possible for this project to be replicated both within the region and in other parts of the world. However, the existing legal framework in each country, the rural population's level of income and the expansion plans of the national electricity grid must be taken into consideration.

It is important to identify and evaluate the local technical capacity for manufacturing equipment and providing technical assistance. If that capacity does not exist, the technology could be transferred to small manufacturers and training could be provided to technicians and professionals.

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Switch on — Demonstration of Rural Housing Energisation

Location:
KwaZulu Natal, South Africa

Project's Aim:
Establish sustainable energy in rural communities

Technical Answer:
Create local energy supply and service

Photo: the Switch On team

This project began in April 2002 with the aim of demonstrating how non-grid energy sources can be used as a means of providing sustainable energy to rural communities, thereby making a significant contribution to climate change mitigation. It involved establishing a rural business in order to make an energy package available to residents of a remote valley in KwaZulu Natal, South Africa. Four members of the targeted local community were carefully selected and trained in the skills necessary to operate a rural energy business. The brand name given to this business was "Switch On" and it is now registered as a Section 21 company. The project finished at the end of February 2004, but the Switch On business continues to serve the local community with ongoing support from Parallax.

The overall goal of the project was to show the extent to which energisation of rural communities can limit the negative contribution of energy use to climate change whilst offering a means for sustainable development. It aimed to determine whether a user-owner model of energisation was effective in the rural South African context, and whether it could be implemented on a commercial basis. A successful demonstration would provide the evidence necessary for widespread replication.

This project was intended as a first phase towards the ultimate goal, since provision of energy for household use was the focus at this stage. Each energy package offered consisted of a solar home system and a stove with bottled LPG gas. Residents who accepted the offer effectively became the owners of these energy packages by means of a special finance agreement, which involved the repayment of an agreed monthly sum over a three-year period.

Photo: a Switch On installation

BENEFITS

The establishment of the Switch On business in this rural community has provided immediate direct and indirect benefits such as improved access to credit and banking facilities, and has begun to contribute to sustainable economic development.

Prior to the project intervention the largest fuel source used in the community was wood, most of which was collected from the surrounding environment. The introduction of LP Gas for cooking, as well as the solar home systems, has significantly improved

the environment of individual households as well as creating the potential for regional and global benefits.

Emissions from fires have been reduced, improving health; deforestation has reduced due to a lower demand for fuel wood; and carbon dioxide emissions are much lower with the new fuel sources.

SUSTAINABILITY

The local business, Switch On Energy Services, which was established during the project has been formally registered as a South African Section 21 community business. It has continued to operate since the end of the project in March 2004. However, without expanding the customer base, the business will not have sufficient income once the existing customers have completed their repayments. A further one-off investment is necessary to ensure the long-term sustainability of Switch On.

TECHNOLOGY

The technology used for electrical and thermal energy needs is proven and is maintained by the local business, with the main components having a life expectancy of over 10 years.

FINANCIAL ISSUES

The total cost of the project was about USD 170,000 over 2 years. This paid for the set-up costs of the business and for the management time of the project partners to establish the demonstration model. This time cost would be greatly limited in any replication of the model. 90 customers were supplied during the project, repaying approximately USD 800 per system. These repayments provide capital for investment into additional systems.

The project in isolation is not commercially viable. However, having demonstrated the model, this could be replicated in other regions of South Africa or in other countries without the time cost for project management and could be a sustainable operation.

Funding was provided by USAID through the South African Department of Environmental Affairs and Tourism. The local municipality of uBuhlebezwe also provided funding in kind, with support for community meetings. Finance for the ongoing operation is provided from customer income. Further finance is being sought to fund the additional investment required by Switch On to establish a market base of sufficient size to allow the continuation of the business after current customers have completed their repayments.

OBSTACLES

Some of the key obstacles were:

- The need for all groups, including traditional and elected leaders, to buy into the project.
- Finding an affordable system that provided modern energy supplies.
- Maintaining the security of installed systems.
- Customers using the batteries provided to charge other appliances (not only the solar systems).
- The cost of supply & distribution in rural areas with little infrastructure.

Some of the actions undertaken to help overcome these obstacles:

- Considerable time was spent before installation to identify an appropriate location with supportive stakeholders.
- An affordable payment rate for the local community was calculated.
- Alarms were installed to the systems to prevent theft.
- Customers were given training when a system was installed.
- Careful logistical planning was undertaken to minimise distances travelled.

REPLICABILITY

The main aim of the project was to develop and demonstrate a replicable business model for the supply of basic energy services to poor and remote communities. This approach, based on an ownership financial model, has been successful and has great potential for replication both nationally and internationally.

To help ensure the success of replication, the current Switch On business should ideally expand its customer base (to approximately double according to project estimates) in order to establish a revolving fund of sufficient size to maintain income levels. Establishing several Switch On businesses supported by a single administrative office, thus sharing overhead costs, would also facilitate replication.

The project has continued to attract widespread interest with an ongoing demand for its replication (including formal requests from local municipality ward councillors).

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Parallax
Sustainable Development Solutions

GreenVillage Credit

A Project of the China Rural Energy Enterprise Development Initiative

Location:
Yunnan Province, China

Project's Aim:
Encourage the use of sustainable energy

Technical Answer:
Develop a new approach to finance

Photo: TNC

Photo: TNC

GreenVillage Credit provides local villagers with two types of credit: household credit to purchase higher quality sustainable energy systems (energy-efficient and renewable energy systems) and a loan for activities that can generate income using the new and improved energy services, such as vegetable and cash-crop plantations, animal husbandry, tourism services and other activities with sufficient financial return.

GreenVillage Credit is designed to help local communities generate income that can then be used to purchase better energy services by their own means, instead of simply waiting for grants and subsidies. GreenVillage Credit explores a new approach to finance in order to promote economic development and environmental protection in the remote mountain communities.

The project entrusts loan capital to local rural credit co-operatives (RCCs) that serve as a platform for financial operations. The project also provides financial and technical support to member households of the local village associations that install new energy systems and conduct income generation activities.

GreenVillage Credit is a part of UNEP's China Rural Energy Enterprises Development (CREED) project that aims to create a clean energy path in China's Yunnan province and surrounding areas. Supported by the United Nations Foundation (UNF), CREED offers enterprise development services for local sustainable energy entrepreneurs and support for household credit and income-generation loans.

The Nature Conservancy (TNC) China Program is responsible for the consumer credit and income generation component through GreenVillage Credit in the north-western part of Yunnan Province.

BENEFITS

Average fuel wood consumption by local household in the project area is around 6 cubic meters per year. By targeting 500–600 households in the area, the project expects to reduce consumption by 15,000 to 20,000 cubic meters over the 15 to 20 year lifespan of the installed sustainable energy system.

The sustainable energy installations supported by this project can significantly reduce firewood consumption, with some households reporting a 30–60 per cent reduction, which in turn helps to protect forest resources, better manage watersheds and reduce greenhouse gas emissions.

In addition to the environmental benefit, the GreenVillage Credit provides other social benefits, such as the development of the capacity for income

generation on a local level, the improvement of local livelihoods and the provision of cleaner indoor air for better health, particularly among women and children.

SUSTAINABILITY

As a means of securing loan repayments to the revolving fund, consumer credit to buy sustainable energy systems is combined with loans for income generation activities. Convinced by the early results of the GreenVillage Credit, the local RCCs have preliminary agreed to provide their capital to the project to scale up the project approach in other villages. One of the aims of the CREED project is to influence existing local financial institutions, such as RCCs, to eventually offer renewable energy finance products as one of their own services.

The project is implemented on-site in partnership with local government, the village association council and RCCs. Demonstration models are installed in target villages to show local people the real costs and long term benefits of sustainable energy. The associated support for income generation activities offers villagers a stronger incentive to pursue the sustainable energy installations that they cannot currently afford.

Although this project has a relatively short time span, it is complemented by TNC's long-term commitment to working with local partners and this alliance enhances the continuity of the project in terms of follow-up technical support after this initial phase.

TECHNOLOGY

The types of sustainable energy installations supported by the project include solar water heaters, commercial fuel-efficient stoves, biogas digesters integrated with a greenhouse for raising livestock or growing vegetables, micro hydropower generators, improved cooking stoves, improved fireplaces for room heating, energy-efficient houses or house retrofitting for better fuel efficiency and indoor air quality, and any other sustainable energy systems that reduce environmental impacts and protect biodiversity.

As of October 2005, more than 280 households in Northwest Yunnan have used the support of this project to install sustainable energy devices, including biogas digesters, solar water heaters and improved cooking stoves/fireplaces.

FINANCIAL ISSUES

The total project budget (February 2004 – June 2007) is USD 668,550, consisting of a revolving fund of USD 400,000 (CREED GreenVillage Credit) and the rest as operational costs for project personnel, sub-contractors and local training to establish efficient and effective project operation.

Although operational for only a short time, GreenVillage Credit has been successfully supporting sustainable energy installations in poverty-stricken remote communities and has demonstrated great aptitude in securing loan repayments and maintaining a revolving GreenVillage Credit fund to cover more communities.

OBSTACLES

Poor affordability and accessibility to modern energy services in remote rural communities are the key obstacles that prevent individual villagers from changing traditional practices of collecting fuel wood for heating and cooking and from adopting sustainable energy technologies.

REPLICABILITY

There is a strong potential to replicate this approach. The design of a revolving fund itself that integrates the installation of sustainable energy systems with support for income generation activities in poor communities is replicable in many similar areas in the world. The project framework has been welcomed by most local communities and positively recognised by local financial institutions, government agencies and other sister NGOs. Existing financial institutions, such as RCCs or microfinance organisations, can be platforms for the financial operations of a revolving fund. In addition, community-based associations to support income generation activities, help assess loan applications and facilitate loan repayments are vital in providing general technical support. These associations can be established relatively easily once the operational framework has been defined.

Communities adjacent to the project villages have showed a strong interest in the GreenVillage approach, and have contacted the project team to discuss the possible expansion of the project to their villages.

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绿色乡村 GreenVillage

Capacity Building for Micro Financing of Renewable Energy Technologies

Location:
Nepal

Project's Aim:
Stimulate and facilitate micro financing of biogas plants

Technical Answer:
Capacity building

Photo: Winrock

Only 150,000 of Nepal's potential 1.9 million biogas plants have been installed and most of these installations are in relatively affluent areas. High transportation costs to remote scattered villages increase system costs. This, together with a decreasing level of government subsidy, means that rural communities must contribute greater amounts of money to biogas installation. However, these subsistence-based rural communities lack the necessary disposable income to pay the upfront costs of plant construction. Therefore, there is immense demand for an affordable means of credit from such communities. Access to credit plays a vital role in making biogas economically viable for these communities.

The USAID supported project on "Capacity Building for Micro Financing of Renewable Energy Technologies" is implemented by Winrock International in collaboration with the governmental Alternative Energy Promotion Center (AEPC) and the Biogas Sector Partnership, Nepal (BSP). The project is designed to expand the installation and use of biogas plants by increasing access to microfinance for lower income purchasers.

The partners have designated roles: AEPC promotes various renewable energy technologies (RETs), provides subsidy, and manages a revolving fund of 2.5 million Euros in wholesale loans to MFIs in order that they can then provide credit to farmers for biogas installation. BSP manages the biogas programme, is responsible for research, promotion and quality control. Winrock works to strengthen both the demand and the supply aspects of financing biogas.

BENEFITS

A single biogas unit is estimated to help directly to conserve 3 tons of fuel wood annually. On this basis, the 2,500 biogas plants installed with project support are saving around 67 hectares of forest annually. 75 per cent of the biogas plants are connected to toilets, providing health benefits related to better hygiene practices. Furthermore, biogas reduces harmful indoor air pollution.

Moreover, each biogas plant prevents an average 4.6 tons of CO_2 emissions from being released into the atmosphere annually. The plants installed have reduced greenhouse gas emissions by over 11,500 tons of CO_2.

As a result of this project, 56 masonry jobs were created through the increased demand for biogas plants among MFI clients.

Interested MFIs, including dairy co-operatives and forest user groups, are now actively promoting biogas plants among their constituents due to the direct link between cattle raising (with the associated income generation) and availability of raw materials for biogas generation and the link between biogas plants and forest conservation.

SUSTAINABILITY

The project emphasises mobilisation of commercial sources of finance and supports capacity building and awareness creation. Once the project can provide this support to a critical mass of MFIs (around 300), biogas micro financing is expected to take off by itself. Already many MFIs have adopted biogas as a suitable loan product. With declining government subsidy, demand for credit will increase.

TECHNOLOGY

Biogas is a proven technology in Nepal with over 150,000 plants already installed and a 97 per cent operational success rate.

FINANCIAL ISSUES

The 2005 project target was to facilitate 1,500 biogas loans amounting to USD 200,000, leveraging USD 500,000 in total investment. The project has exceeded this target by facilitating the construction of 1,572 biogas plants through micro credit.

The project has contributed to an increased understanding among MFIs and companies of biogas technology and its financing. The number of micro credit financed biogas plants will increase in the coming years when commercial banks and MFIs move aggressively into this sector. Some commercial banks have already agreed to provide wholesale loans to MFIs for biogas financing.

Past experience indicates a time delay between capacity building activities and the resultant outcomes. Therefore, it is very difficult to carry out a comprehensive financial input and output analyses of the project at this stage. Through the involvement of two full time professionals, the project, in its two years, has secured USD 333,000 investment in MFI loans, leveraging USD 833,000 in total investment. Training programmes have been conducted on a cost-share basis with MFIs and partner organisations mobilising over USD 50,000 in additional financial resources.

OBSTACLES

The major problems identified were a lack of awareness about RET micro financing among MFIs, limited sources of wholesale financing and inadequate functional linkage between MFIs and the energy companies. The project is designed to address these problems and has a three-pronged approach i.e. capacity building of MFIs, linkage facilitation between various stakeholders and lobbying to create a favourable policy environment.

A number of beneficiaries of the first phase of the training programme were visited to determine progress and to identify barriers and constraints in financing biogas. A platform has been provided for successful MFIs to share experiences.

REPLICABILITY

Poor households living in rural areas are deprived of RET benefits due to their lack of disposable income. They are unable to pay the cost of installing systems upfront and need affordable credit. There is, therefore, a universal demand for credit which MFIs can provide cost-effectively.

Photo: Winrock

This programme can be replicated by other MFIs and for other RET technologies since the project mobilises AEPC and other commercial sources of funds and promotes the establishment of competent institutions in this sector through various capacity building initiatives. The training materials and programmes have already been developed and tested, with the result that this type of project can be replicated with marginal incremental cost in the future.

Based on the success of micro financing biogas, MFIs were also trained in micro financing solar home systems, improved water mills and solar tukis (WLED based solar lamps). A number of MFIs have already started financing such systems.

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Prior Issues

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I. Issue 2005	Sustainable Transport – Solutions for Growing Demand
II. Issue 2005	Sustainable Tourism – Combining Holidays with Local Needs

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